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13. ABSTRACT (Maximum 200 words) 1. Metabolic differentiation to solventogenesis with slowing growth rate is sequential rather than simultaneous in <u>Clostridium beijerinckii</u> , with the production of butanol occurring in stage III of sporulation. 2. A pathway to n-propanol rather than to 2-propanol appears in this species at very slow growth under carbon limitation. 3. A constant fraction of carbon-energy substrate is used by <u>Clostridium</u> strain C7 for cellulase secretion at any growth rate: exoenzyme production is independent of maintenance energy costs and can therefore be produced efficiently at any growth rate. 4. Transformation in <u>Bacillus subtilis</u> occurs with maximum frequency at a doubling time of 2-3 hours, a region in which the cell is switching from anabolic to catabolic limitation. 5. A segment of pBR322 plasmid DNA has been stably inserted into the chromosome of <u>C. beijerinckii</u> to serve as an integration site for genes cloned on <u>Escherichia coli</u> vectors.					
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Chesbro, W., M. Arbige, and R. Eifert. 1990. When nutrient limitation places bacteria in the domains of slow growth: metabolic, morphologic, and cell cycle behavior. Fed. Europ.Soc. Microbiol. **74**:103-120.

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